

December 3, 1999

SPACE CENTER Roundup

VOL. 38, NO. 23 LYNDON B. JOHNSON SPACE CENTER, HOUSTON, TEXAS

Inspection99

Follow-up phase begins

By Nicole Cloutier

The signs are all down, exhibits packed up and tables stowed away, but Inspection99 is by no means over. Scores of volunteers, some of the 2,800 who volunteered to make the on-site event a success, will begin following up on the hundreds of requests for additional information from 199 guests.

"We've received more than 650 Technical Assistance Requests," said Charlene Gilbert, Inspection99 chairperson. "It's a great testament to the success of the event and one that will encompass months of follow on activity from our incredible staff to make sure all leads are explored."

This year, staff will be using an online tracking database to log the requests and follow up activity. Organizers hope the new process will be easier for users and will help ensure all requests get all necessary attention.

"In addition to implementing a new Web-based TAR entry and status system, we're also capturing 'lessons learned,'" said Gilbert. "We'll soon have the capability to track them on the Web."

More than 2,500 business, industry and manufacturing professionals took advantage of the three-day event to talk with NASA representatives and investigate opportunities to convert space technology to on-Earth benefits. Organizers say there were a higher number of manufacturing and petrochemical guests than in years past and more decision-makers.

"Assessment of the registration data indicated a shift to a more technical audience this year," said Gilbert. "The interaction between attendees and our technical personnel was key and played a significant role in Inspection99's success."

This year's audience also reflects the growing international marketplace, as people from 27 countries, 44 states, Puerto Rico and D.C. pre-registered to attend. As with years past, guest feed back from Inspection99 has been positive.

"This has been a great event," said Henry Morton, president of Selectronics, an electrical design and manufacturing company. "They've done a fabulous job putting it together and everyone we've met has been very cordial."

Morton and his wife, Christine, traveled from Wadesboro, N.C. to tour Inspection99 all three days.

"We have been going non-stop since our arrival Wednesday, and we haven't even made it to the electronics section yet," said Christine Morton the Friday afternoon of Inspection. She serves as vice president of acquisitions for the firm and said they had already seen several technologies they were interested in exploring further. "Particularly, methods for developing non-invasive biomedical sensors," said Morton.

The annual exhibition is tailored for business and industry entrepreneurs receptive to ways to maximize developments done in the pursuit of space exploration. But there are other benefits as well.

"Inspection also is a unique opportunity for JSC employees to see firsthand what other organizations throughout our center are doing," said Ray Melton, technical assistant to the manager at White Sands Test Facility. "It really reinforces the unity of working for NASA, and our



NASA JSC Photo 99E13764 by Benny Benavides

More than 2,500 business, industry and manufacturing professionals took advantage of the three-day event to talk with NASA representatives and investigate opportunities to convert space technology to on-Earth benefits.

presence at this event is a good reminder that we're part of the JSC team."

WSTF representatives said they had an excellent response from the visitors adding there was no substitute for having face-to-face contact with technical points of contact. He cited one case where he was discussing with a Hamilton Sunstrand visitor the computer modeling

technology WSTF had developed and the testing done there to simulate the impact of micrometeoroids and orbital debris (MMOD).

"He came to our table and was very impressed by the work we had done on MMOD impact analysis and simulation, and said it would be really valuable for his work with the space suits," said Melton. "He was astonished when I told him we'd already done several hypervelocity impact tests on actual EVA suit materials, and the gentlemen who ran those tests is right over there. A few minutes later the two engineers had met and discussed the testing, and with a quick phone call we had a copy of the test report on its way to the space suit engineer that very day! That was very gratifying to be able to have that kind of immediate, direct result. That is just one example of what makes these Inspection events so valuable."

WSTF was only one of many NASA sites that took advantage of Inspection to make technical points of contact. Stennis and Goddard Space Flight

Center also participated and Ames Research Center had numerous exhibits at the event. Approximately 80 exhibits were provided by other NASA centers, universities and industry.

"We were pleased to have such a significant number of our NASA and NASA-team colleagues participating," said Gilbert. "Their enthusiasm in supporting this year's Inspection, in both the number of exhibits and in technical personnel, was outstanding." ■

"We were pleased to have such a significant number of our NASA and NASA-team colleagues participating. Their enthusiasm in supporting this year's Inspection, in both the number of exhibits and in technical personnel, was outstanding."

— Charlene Gilbert



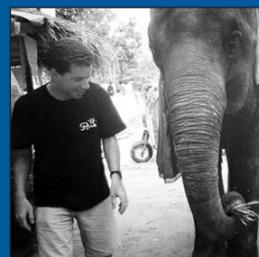
X-38 vehicle at JSC for modifications.

Page 2



Inspection99 reviewed in pictures.

Page 5



Employee shares tales from Thailand.

Page 7

X-38 vehicle at JSC for modifications, new electrical components

The V-131R, one of two test flight prototypes for the X-38 emergency crew return vehicle, is in town for some upgrades. The vehicle had been with its original manufacturer, Scaled Composites, Inc. in Mojave, Calif. since February having some airframe modifications done. It is now back at JSC to have internal electrical components installed.

The most obvious modification to the vehicle was changing its outer mold line to match the actual space flight test vehicle, V-201, mold line. Designers also added a simulated docking ring and new fins so they could assess the structure's impact on the vehicle's aerodynamics.

"The aft surface is now more rounded and aerodynamic versus the more angular look it had previously," said Wayne Peterson, V-201 delivery manager. "It varies from front to back, but generally speaking, the upper surface was raised about six inches. However, because the vehicle is designed to descend with a high angle of attack, close to 40 degrees, the top-side structures likely won't affect its performance until the craft reaches the supersonic and transonic flight regimes."

Designers also incorporated a full-scale 7,500-square-foot parafoil and accompanying drogue chute to the vehicle in order

to get early test experience with the larger chutes. Previously, the V-131 had a 5,400-square-foot parafoil, but it will now use the larger parafoil destined for V-201. The space flight vehicle requires the larger chutes because it is larger and heavier than the atmospheric vehicles.

"To do that, we'll have to add several thousand pounds of ballast to try to get the wing loading to a reasonable level," explained Ed Robertson, V-131R delivery manager. "Additionally, we'll be flying parafoil guidance software in the flight computer rather than in a separate unit."

All of this entails significant electrical work inside the vehicle and inclusion of a high voltage system. The modifications on V-131R should be complete in March or April. V-132 is currently at Dryden Flight Research Center preparing for an early December drop test. ■



NASA JSC Photos S99-13593 and 13596 by Robert Markowitz
Ann Sanders, X-38 co-op, and Greg Buoni remove the nose from the V-131R vehicle for internal electrical work. The vehicle (left) also has a new profile after changes were made to its composite exterior to match the actual space flight test vehicle.

X-38 Needs You!

Are you interested in helping build the first new human spacecraft NASA has developed in the last two decades? Join the X-38 Project Team.

The X-38 Project Team is building a space flight test vehicle as a prototype for the Space Station Crew Return Vehicle. This vehicle, V-201, will fly on board the space shuttle in 2002, be deployed by the robotic arm, and fly the CRV mission from deorbit burn through touchdown.

X-38 is looking for civil servants – any level of experience, any pay grade – for a



NASA JSC Photo S99-14198 by Bill Stafford
Getting together one last time are the current and former detailers of the X-38 Tile Team, from left, Claudia Hess, Marilyn Davison, Dale Martin, and Alex Dula.

12-month rotational assignment to bond thermal protection system tiles, blankets, and insulation to the V-201 skin panels. No engineering or technical training will be required.

Employees will report to the Manufacturing, Materials, and Process Technology Division, and return to their home organizations at the end of the tour.

If you are interested, contact Nicole Dickerson at 281-244-1613, or e-mail ndickers@ems.jsc.nasa.gov.

For details about the duties and responsibilities of the position, contact Joe Zamaitia of the Fabrication and Assembly Branch at 281-483-2260. ■

Japanese components tested for space station software compatibility

Representatives from NASDA, the Japanese space agency, and NEC Corporation, a Japanese engineering company, recently completed Early Integration Testing with Boeing engineers at the Software Verification Facility located in JSC's Sonny Carter Training Facility.

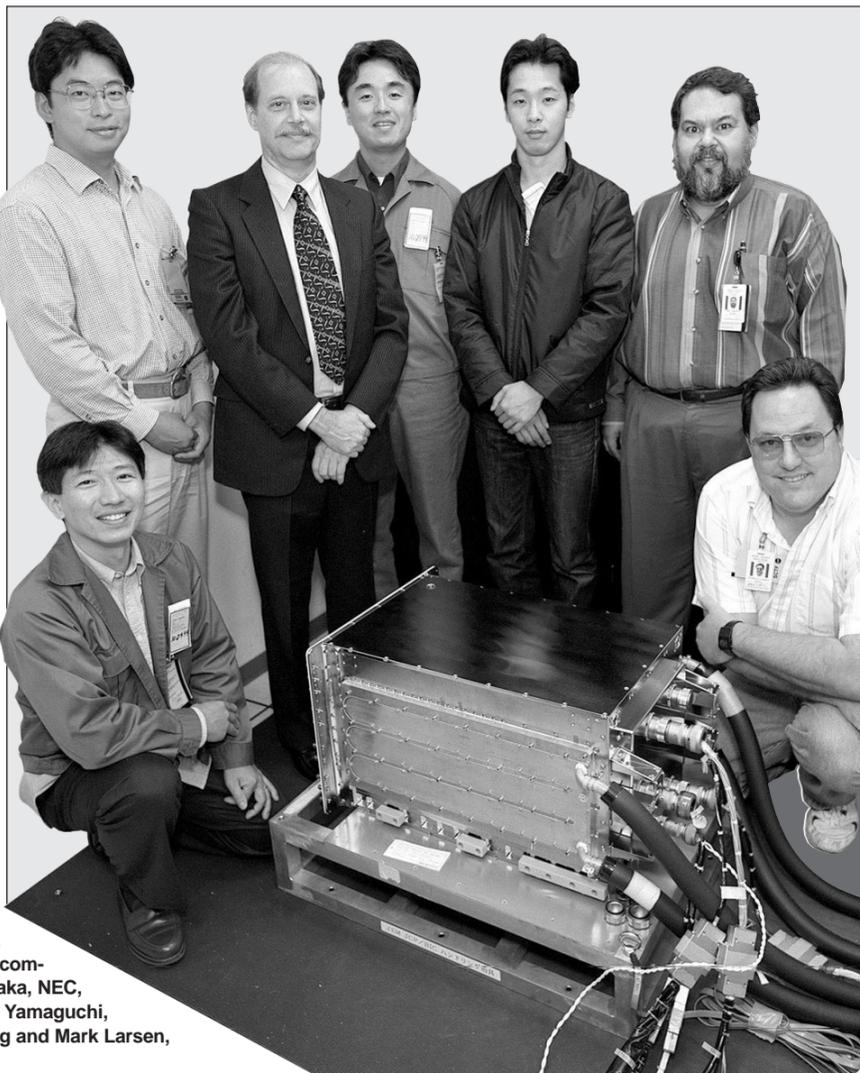
The teams completed the second in a series of three risk mitigation tests for the Japanese International Space Station components.

In October, four NASDA and NEC engineers worked with the Boeing Houston team to test the Japanese Experiment Module (JEM) Control Processor (JCP), the main processor for the Japanese ISS element. This is the first time the JCP has been connected with the ISS Command and Control Processor.

The tests verified communications protocols between the two processors.

"The tests went very successfully," said Mark Larsen, Boeing test director. "We uncovered some problems that otherwise we wouldn't have known about for some time. It's much easier, and cheaper to fix these problems now than later in the development life cycle."

Left to right: Representatives from the National Space Development Agency of Japan (NASDA) and NEC Corporation recently visited JSC to work with Boeing to test software for the Japanese ISS components. The testing team included Takahiko Tanaka, NEC, Tsuyoshi Ito, NASDA, John Selke, Boeing, Masaru Yamaguchi, NEC, Akira Ono, NEC, and Israel Gonzales, Boeing and Mark Larsen, test lead, Boeing.



The second part of the test included the Japanese robotic arm Management Data Processor (MDP), and its interface with the Command and Control Processor. Toshiba is the developer of the MDP.

The first ISS component software test conducted with representatives from Japan was in April 1999. At that time, NASDA and Mitsubishi representatives came to JSC to perform Early Integration Testing of the Data Interface Unit III (DIU III). The DIU is manufactured by Mitsubishi Heavy Industries.

"That was a flawless test," said Larsen. "It went very smoothly. And we learned a lot from each of these tests, as far as how to work better with our Japanese counterparts. They have been very cooperative."

When the testing in the U.S. is complete, all units will go back to Japan for any modifications needed to correct discovered flaws. The team plans to meet next in mid 2000 to conduct additional testing of the software interface components. At that time, they'll meet at the NASDA ISS testing facility in Tsukuba (pronounced scuba) Japan, for testing of the entire JEM interface.

A fourth test is slated for 2001, which will be a Stage Verification test against the final flight software here in Houston. ■

De la Fuente, Olivas earn top honors at Hispanic conference

TransHab Deputy Project Manager Horacio de la Fuente and Astronaut Candidate Dr. John Olivas earned high honors during the Hispanic Engineer National Achievement Awards Conference held recently in El Paso.

JSC's de la Fuente took home the award for Outstanding Technical Achievement-Government, while Olivas was named Most Promising Engineer.

Since joining NASA in 1985, de la Fuente has achieved outstanding success, while making significant contributions in the engineering field. Responsible for the solution of special problems occurring during the design, development, manufacturing, qualification, and flight of human-rated spacecraft, he has proven himself to be an exceptional engineer.

Providing leadership on a wide array of engineering concepts, de la Fuente was at the forefront of the design and development of the TransHab, destined for potential use as a crew living quarters aboard the International Space Station and as a vehicle to carry humans to Mars. This significant milestone in lightweight vehicles for space exploration earned his team a Rotary National Award for Space Achievement Stellar Award.

In another major achievement, de la Fuente designed and developed a transparent Lower Body Negative Pressure Device for flight crew evaluation which allows full visual monitoring of the patient during testing. The device is being used in many U.S. and international medical institutions.

Featured in *Newsweek* as one of many rising young Latinos who are changing



JSC Deputy Director Capt. Jim Wetherbee, center, congratulates Hispanic Engineer National Achievement Awards Conference winners Dr. John Olivas, left, and Horacio de la Fuente.

the face of America, Olivas is a fourth-generation Mexican American and the ninth Hispanic to be selected as one of NASA's astronauts.

Although his 10-year trek to NASA's astronaut program took much longer than a trip to the moon, Olivas never gave up hope that one day he would realize his childhood dream. Throughout that period, he launched a promising career.

At Dow Chemical, Olivas designed a sliding pump base to compensate for high thermal growth of the first-of-its-kind process piping. At SEAL Laboratories, he impressed colleagues with his grasp of

mechanical and metallurgical engineering. At the Jet Propulsion Laboratory, his work was impressive enough to get him quickly promoted to lead the NASA Electronics Packaging Program, where he got a chance to exercise his technical management skills in addition to conducting research in the area of microelectronic materials evaluation for space application. Olivas also has two U.S. patents pending on behalf of JPL, one for an Ultra-sensitive Displacement Sensing Magneto-resistive Microelectromechanical Device, the other for a Protective Fullerene Packaging System for

Microelectromechanical Systems Applications.

"I am truly honored to receive this award along side some of our country's finest engineers and scientists, like Horacio de la Fuente," said Olivas. "My hope is that I can accomplish in my career what those award recipients before me have accomplished in theirs."

In June 1998, Olivas became one of 25 Americans selected to the 1998 Class of United States and International Astronauts. Currently undergoing training at JSC, he is expected to be flight qualified in 12 to 18 months. He also supports the Robotics Branch and other aspects of the space shuttle and International Space Station programs.

This year HENAAC organizers also included a special panel presentation highlighting NASA opportunities for undergraduate and graduate students. The seminars drew speakers from NASA Headquarters, Dryden, Langley, and Marshall.

Dr. Marla Perez-Davis, technical manager in the Plans and Programs Office at Glenn Research Center, was one of the featured speakers who addressed the subject of women in technology during another panel presentation.

In addition, middle and high school students from the El Paso Tri-City area got a chance to check out the many technical and scientific careers available to them during HENAAC's Pre-College Career Day. The Pre-College Program event featured speakers from many NASA centers including engineers from JSC, Ames, White Sands, and Dryden. ■

High school students get exposure to high-tech arena

More than 80 area students visited JSC November 8 as part of the High School/High Tech Expo. The expo is designed to provide students with disabilities a chance to meet with education and business representatives to help them get started in the high-tech arena.

"The three fastest growing job sectors are all computer related," said Nellie Wild, national program manager for the President's Committee on the Employment of People with Disabilities. "Businesses across the nation are searching for qualified technology professionals."

With that in mind, NASA partnered with United Cerebral Palsy in 1992 to help

these students realize their potential in this market. The program started with Goddard Space Flight Center and in 1995 was expanded to Ames Research Center, Lewis Research Center and JSC.

JSC has provided site tours for groups of students, as well as summer internships for two to three students each year. Additionally, JSC has hosted an annual kick-off or expo event four out of the last five years. Jessie Hendrick, JSC's Individuals with Disabilities Program manager in the Equal Opportunity Programs Office, oversees the program at JSC.

Many other local organizations have joined in including the National Weather

Service, the University of Houston, and South Texas College of Law.

"The program is successful because of the one-on-one involvement with students by professionals in high-tech fields," said Hendrick. "Students who have participated in the program and worked here at JSC are now attending colleges such as Rice University and Rochester Institute of Technology. We are hoping that some of these students will be part of JSC's future workforce."

Many JSC representatives contribute to making that happen, including Estella Hernandez Gillette, JSC's director of Equal Opportunities Programs, who was

recognized at the luncheon for her contributions, and Leroy Villareal, Information Systems Directorate lab manager.

"I became involved because I have always enjoyed teaching," said Villareal. "I like seeing the confidence on the students faces after they understand computers are not difficult to repair or upgrade. I feel the students take this understanding of computers with them and they seem to walk and talk with new confidence toward anything else they may have to work on."

"It's a very challenging program," said Clemente Quintana, X-38 life support engineer. "With the right motivation, there's nothing they can't do." ■

Brownie Girl Scouts honor NASA robot 'DART' as one of their own

This fall, a NASA robot became an honorary Brownie Girl Scout in a special ceremony in Bldg. 9.

Brownie Girl Scout Troop 152, a contingent of the South Texas Girl Scout Council, descended on JSC October 25 for an investiture ceremony deeming the Dexterous Anthropomorphic Robotic Testbed (DART) as a Brownie Girl Scout. The ceremony included a Girl Scout pledge and presentation of a Brownie sash.

Afterwards, Jessie Hendrick, JSC's director of Federal Women's Programs, presented the troop with a *Women of NASA* poster.

Astronaut Tammy Jernigan, a former Girl Scout and Lifetime Member of Girl Scouts, also made a presentation to the troop.

"Some of the things I learned in Girl Scouts I still use today," said Jernigan, "like how to work together. Working as a team is very important up in space."

The troop, comprised of nearly 20 five- to seven-year-old girls from the local area,

originally 'met' DART during a visit to JSC this spring as part of a special field trip focusing on women in science careers.

"DART was the one thing the girls remembered the most," said Joanna Grimmer, the troop leader. "The girls were just fascinated when they first saw DART and discovered it had a female voice."

DART, like many robotic/automated systems, features a female voice and resides in JSC's Dexterous Robotics Laboratory in Bldg. 9C. Although it is permanently mounted to the laboratory structure, DART has a great deal of mobility with its ability to rotate at the "waist" while moving its arms and hands much like a human. An operator sitting in a specially equipped chair can dictate DART's torso, head, arm and hand movements using virtual reality gear. DART can tie knots, grapple objects, and even manipulate tools. DART is a testbed for developing and demonstrating technologies that NASA is using in advanced robotic projects. ■



Honorary Brownie Girl Scout DART and Brownie Girl Scout Troop 152 with Astronaut Tammy Jernigan and (left to right) Ruth Griffin, Tanya Brewster, Shirley Olsen, Kathleen Jurica, NASA, Freda Birdwell, Joanna Grimmer, and Jessie Hendrick, NASA.

NASA JSC Photo S99-13294 by Bill Stafford

Space-based telemedicine device goes commercial

One of the many NASA-developed technologies on display during Inspection99 was a unique device that may revolutionize the way medical exams are performed in the future.

The Telemedicine Instrumentation Pack (TIP) resembles a small metal suitcase and weighs about 40 pounds. This portable system was designed to meet the constraints of space flight. During a mission, the TIP allows the crew medical officer, who may not necessarily be a physician, to monitor a fellow crewmember's heart, lung, and bowel sounds; ear, nose, throat, and skin conditions; and electrocardiogram, oxygen saturation, and blood pressure. The crew can then transmit the medical data to the Mission Control Center flight surgeon or other medical specialist to get a diagnosis and suggested treatment.

The TIP could be used on Earth in any setting where access to health care or medical specialists is not readily available. This enormous commercial potential excited Stephen Wyle, president of CyberMDx, who is currently developing a business model to expand the use of what he calls the

"doctor's electronic medical black bag."

"TIP is a prime example of NASA-developed technology that has applications on Earth," said Wyle.



The Telemedicine Instrumentation Pack

Diagnostic data collected using TIP's sensors, fiber optics and computer chips is presented in an electronic chart, which can be e-mailed to physicians and specialists who can then review it and make

recommendations, with doctors and examiners at separate locations engaging in a kind of medical teleconferencing.

According to Wyle, physicians can't visualize how TIP can be used in their practice, but he believes that use of the device will increase. Rather than having employees travel to clinics for exams and diagnoses, businesses can set up a TIP clinic on site with a nurse. The patient can visit the nurse, who can collect all necessary data and e-mail it to a distant doctor. The doctor can then review the data and make recommendations. Or the record can be e-mailed to a specialist. The company would save money on the costs associated with running a fully staffed clinic, and the process would allow health maintenance organizations to be more responsive to patients, while reducing costs.

TIP can be used for diagnosing ambulatory problems or for more chronic or severe issues like fluid in the lungs. Wyle hopes to expand the capabilities of TIP to cover blood analysis and ultrasound.

CyberMDx hopes to win approval from the U.S. Food and Drug Administration soon, allowing it to begin marketing the

device. Wyle envisions the devices in offices, nursing homes, remote work areas, offshore oil platforms, and cruise ships. Since it is portable, it could be used in ambulances.

The problem now is to develop a business model for use of the device that will fit into the existing regulatory environment. Medicare will not pay for medical examinations using the technology that do not have doctors at each site. And issues could arise over medical licensing if doctors are licensed to practice in one state but clients are in another.

Wyle learned about TIP last year when Wyle Laboratories, a company founded by his father, acquired Krug Life Sciences. The acquisition included the rights to TIP. Since neither company was structured to develop the device commercially, Wyle left Wyle Laboratories and started CyberMDx, which is developing the project with assistance from the Houston Technology Center, a business accelerator that helps companies commercialize new technologies.

CyberMDx is based in Los Angeles but its technical staff is located in Houston.

Wyle has high hopes for spreading the commercial use of NASA-developed technologies. "We want to become a poster child for NASA to see technologies it develops become commercialized," said Wyle. ■

Navigational tool helps the visually impaired surf Web

A Web search tool that is helping visually impaired people retrieve text-based data quickly off the Internet was one of many NASA-developed technologies on display during Inspection99.

An acronym for Internet Library Information Access Device, ILIAD was originally developed in 1995 at JSC by a NASA/contractor team as a classroom aid for teachers, who are among NASA's biggest consumers of information about the space program. Because many teachers have limited computer access, they needed a simple, timesaving way to search the Web.

The idea behind developing ILIAD was to enable teachers to send electronic mail on a very simple computer. The mail would come to computers in Bldg. 12 at JSC, where it would be automatically processed and an electronic search would be conducted over the Internet using key words listed in the message. An e-mail message would be sent back to the user.

The original, e-mail-based version of ILIAD has been operational since July 28, 1995. A Web-based version was developed in 1997.

It happens that ILIAD's text-based e-mail interface is ideally suited for Internet users who are either blind or visually impaired. That's because visually impaired Web surfers much prefer using text-based e-mail search tools to graphical Web browsers such as Microsoft Internet Explorer or Netscape Navigator.

Early on, all software primarily ran in text-mode under MS-DOS. Blind users could access information using DOS-based screen readers and e-mail programs. But as computers and software technology expanded to reading graphical material, text-based software became almost obsolete.

It's not just that blind people can't see the graphs and charts. Information in charts and graphs can't be read as text by most browsers.

That's where the ILIAD system comes in. Not only does it search out text-based information on the Web but it can also strip the coding from some graphical material and present the information in a text-based format. Then visually impaired Web surfers can use computer-voice programs to have the data read to them by their computers, or

magnify the text to read via enlargement programs. They can also print out the information in Braille.

Dr. Robert Shelton, a blind NASA/JSC computer scientist, was one of the members of the team that developed ILIAD.

"When I took over the project, I was new to the Internet," said Shelton. "ILIAD has opened up the Internet as a resource for me." He uses ILIAD, as do other members of his Learning Technologies Project team, when he needs to do Web searches.

ILIAD was designed to be quick and extremely easy to use. Visually impaired users send an e-mail message to the ILIAD home address and type in the search request using keywords.

ILIAD allows users to send keyword queries to multiple search engines on the Web. The program screens out highly graphical and duplicate documents, performs searches off-line, and has search results e-mailed as full-text documents, all in a

quick turnaround time-usually 15 to 30 minutes. Specialized options include sending keywords to a single Web search engine, receiving search results with embedded hyperlinks or as an HTML document, and retrieving documents from a specific Web address.

The receiver must then have the means either to magnify the text, have it printed in Braille, or have it read. Most computers today come equipped with zoom-text features. And text-to-speech software can be purchased for

only a few hundred dollars.

Most ILIAD users receive the results of their searches as individual text documents in their e-mail.

"ILIAD is a gateway for blind people," said Shelton. "It gives them an incentive to use other advanced tools as appropriate or, in some

cases, they are content to continue using ILIAD."

Since becoming operational, the ILIAD site has had more than 10,000 visits, with the NASA site averaging approximately 1,000 search requests each month.

The ILIAD Web site is located at JSC and on the campus of the University of Texas. The American Foundation for the Blind in New York is exploring the possibility of hosting ILIAD on its server as a permanent home.

There's no charge

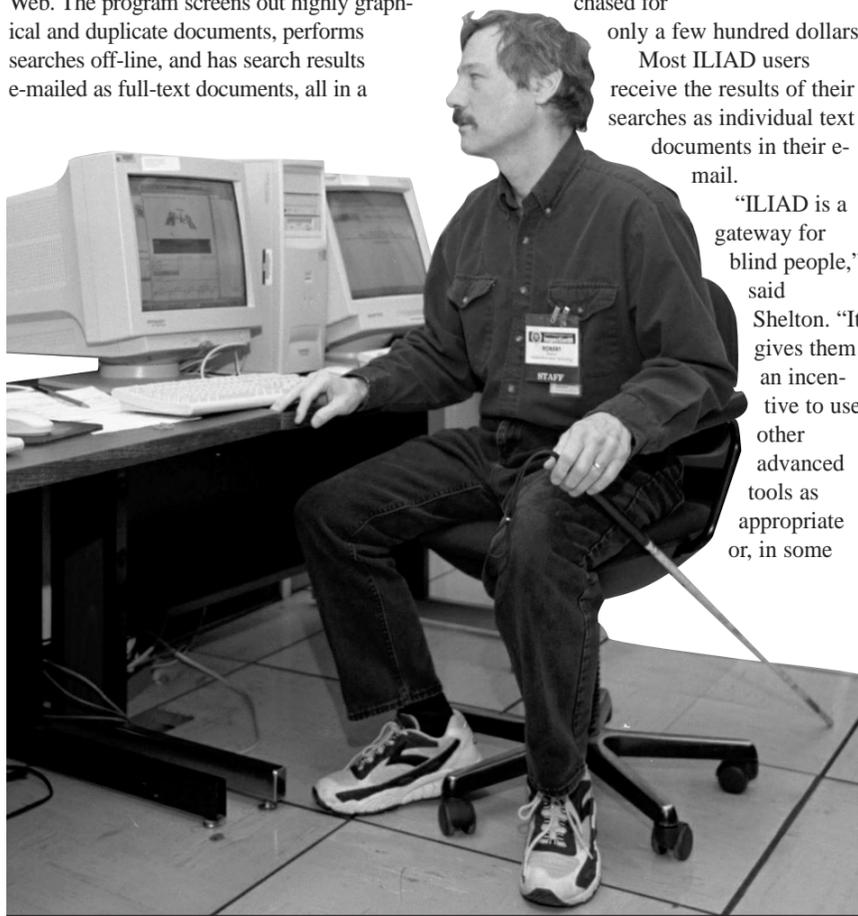
and few hardware requirements to use ILIAD. All that is needed is a computer, a modem of any speed, and an Internet service provider to access the site.

For information on using ILIAD, send an e-mail message to iliad@prime.jsc.nasa.gov or iliad@rosy.tenet.edu. The subject line should be "start iliad" (with no quotes), and the body of the message should be empty. A return e-mail will walk users through their first session.

The goal of NASA's Learning Technologies Project is to promote the growth of a national information infrastructure using the vast amount of information NASA has acquired since its creation. In addition to Shelton, other members of the LTP team at JSC are Stephanie Smith, Dat Truong and Terry Hodgson.

Some of LTP's other unique projects include NASA Qwhiz!, an Internet game created for K-12 students and teachers that allows children in schools throughout the nation to compete in live, head-to-head NASA Qwhiz! tournaments in which they are tested on their knowledge of NASA missions, and SIMON, a smart search tool and Web lesson builder for teachers.

A new Web-based software tool called ROVER Ranch that uses 3-D VRML modeling techniques to teach K-12 students fundamental concepts about science and robotics will be available next fiscal year. ■



Dr. Robert Shelton, JSC computer scientist, discusses the use of the Internet Library Information Access Device during Inspection99.

NASA JSC Photo S99-13798 by Benny Benavides

Inspection99

Review in pictures



NASA JSC Photo 99E13663 by Bill Stafford
Eric Ernst, Kennedy Space Center, discusses Cryogenic Insulation System development with Inspection99 guest.

Dr. Benjamin Mosier, president of the Institute for Research, Inc., was on hand during Inspection99 to discuss the drug delivery system that he and his firm and JSC have been developing.



NASA JSC Photo 99E13789 by Benny Benavides

Jim Lewis, right, NASA X-38 docking system team lead, explains a full-scale mockup of the Low Impact Docking System to Inspection99 guests.



NASA JSC Photo 99E13734 by James Blair

Kenneth Lindsay, left, NASA Ames Research Center, and Mark Galyean, Louisiana Department of Economic Development – Ellington Field, inspect Neuro Adaptive Flight Controller.



NASA JSC Photo 99E13744 by James Blair



NASA JSC Photo 99E13711 by Robert Markowitz

Lupita Armendariz, equal opportunity specialist in JSC's Equal Opportunity Programs Office, visits with an Inspection99 guest.



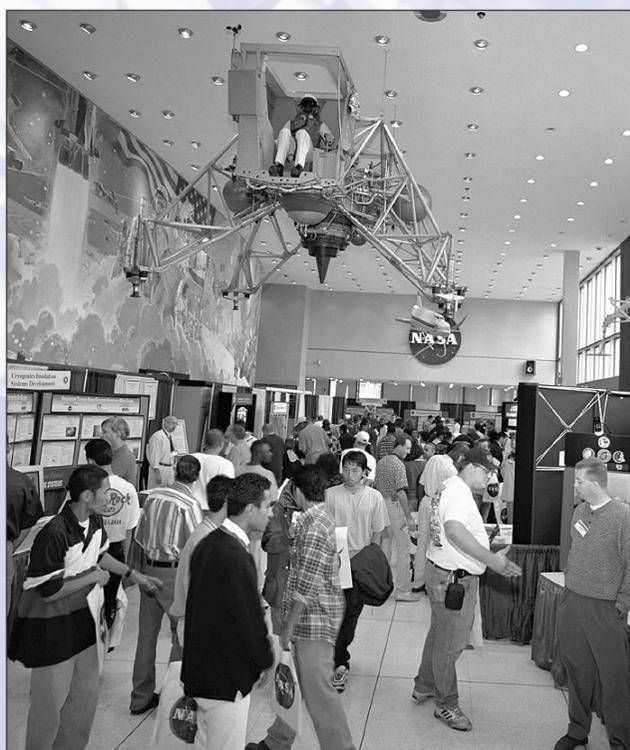
NASA JSC Photo 99E13732 by James Blair

Astronaut Chris Ferguson signs autographs in Building 17.



NASA JSC Photo 99E13683 by Robert Markowitz

Dan Colbert, Rice University, discusses nanotechnology with Inspection99 guest.



NASA JSC Photo 99E13791 by Benny Benavides

Inspection99 guests check out exhibits in the lobby of Building 2.

Time in Thai: *Employee shares tales from International Space University*

After spending ten weeks in Thailand, studying with more than 80 other "students" from 24 countries, JSC's Mike Machula learned more than the obvious lessons one would expect from the International Space University – he also learned the momentous impact that cultural differences can have, no matter how noble the project.

Machula plans to give an informal presentation about his experiences at noon December 16 in Bldg. 4N, room 1042. The presentation is open to anyone interested in more information on ISU or Machula's trip adventures, where he says, he was given the chance to think about the big picture of space exploration.

"Within the current NASA space program, we are used to communicating easily," explained Machula. "But as our ISS activities and assembly ramp up, communication will become more of a challenge. The opportunity to interact with people from different countries and learn more about their cultures is invaluable – you can't underestimate the role that these cultural differences play in such a large endeavor as the space station."

With that in mind, the students convened at Suranaree Institute of Technology in Nakhon Ratchasima for 10 weeks as part of ISU's prestigious Summer Session Program. The locale may seem an unlikely site for the study of space sciences, but the change of venue is in keeping of the international spirit of ISU. Plus, rationalizing the pursuit of space exploration amidst the poverty of a developing country was a challenge that added a new dimension to the students' objectives.

"Imagine if the Queen of Spain never gave Columbus the jewels to finance his legendary expedition?" said Machula. "Space exploration is an investment – not a luxury."

In fact, one of the purposes of the ISU, is to use the time and resources of the attendees to investigate ways space technology can be translated into improvements on Earth. After the students took in four weeks of academic lectures, covering everything from law and management to satellite applications and space in society, they were divided into two groups to work on a design project. One, entitled, *Disaster Management in South East Asia*, examined ways that space-derived technologies, such

as remote sensing and the global positioning system, may address the issue.

Machula worked on a separate project entitled *International Strategies for Human Exploration Away from Earth*, which was a broad-scale examination of future space pursuits.

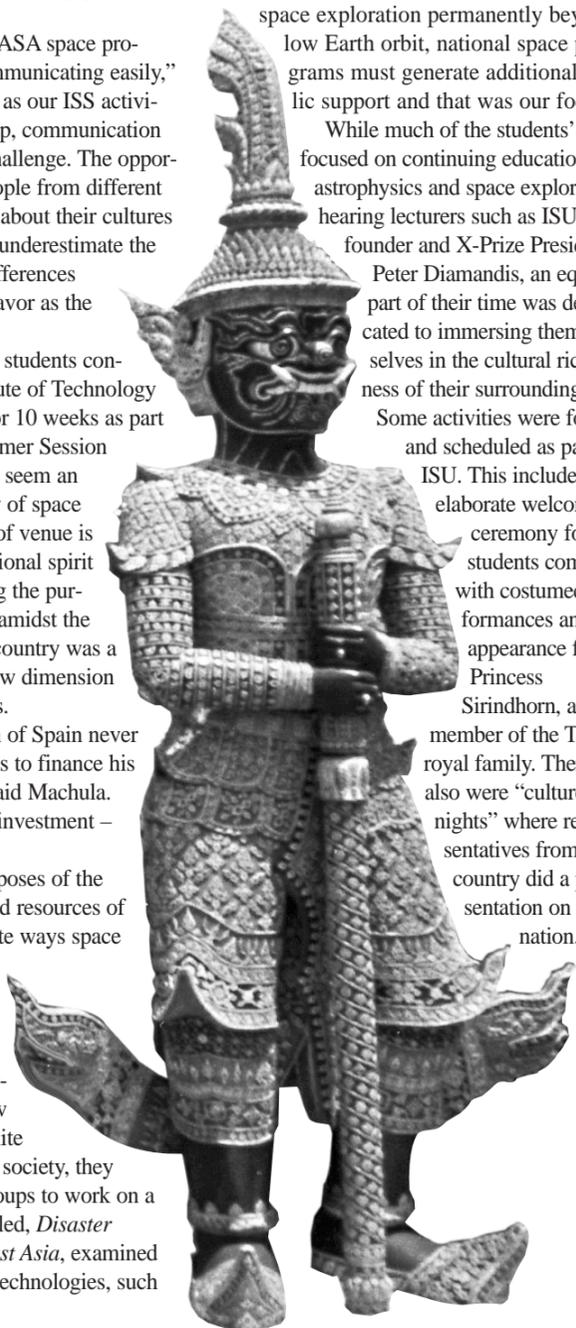
"I chose the exploration project because, even though we just started building the ISS, I feel we need to start looking ahead and formulating a solid plan for how we can best explore the remainder of the solar system," said Machula. "Our team agreed that the shuttle will play a significant role in future exploration programs but we also concluded that to truly move space exploration permanently beyond low Earth orbit, national space programs must generate additional public support and that was our focus."

While much of the students' time focused on continuing education for astrophysics and space exploration, hearing lecturers such as ISU

founder and X-Prize President Peter Diamandis, an equal part of their time was dedicated to immersing themselves in the cultural richness of their surroundings.

Some activities were formal and scheduled as part of ISU. This included an elaborate welcoming ceremony for the students complete with costumed performances and an appearance from Princess Sirindhorn, a member of the Thai royal family. There also were "culture nights" where representatives from each country did a presentation on their nation.

This statue represents a spirit guardian protecting the gates to the temple at the Grand Palace in Bangkok. ISU visitors learned about different cultures worldwide, as well as that of their host country, Thailand.



Mike Machula, left, and Steve Topliss, far right, a Ph.D. student at the University College – London, immerse themselves in the Thai culture at the International Space University.

"We found it difficult to prepare an American cultural presentation because of the sensitivities most other countries have about Americans," explained Machula. "To pull it off, we made the presentation interactive and light-hearted using parodies such as 'Americans have solved the Mars food issue!'

We've already developed the ideal space food call the Twinkie, which has a shelf life of seven years!"

But during off-hours, students were free to partake in the ethnic treasures as they wished, and in Thailand, the options were very exotic.

"We were able to do a lot of exploring because you could rent a ten-person van, with a driver, for only \$40 a day," explained Machula.

Machula spent a day with a local host family who ensured that he saw the best of Thailand. According to Machula, the most exciting day included a trip to the floating market and a visit to a crocodile farm. Likely

the most exciting, and daring part, was when he was pulled as a volunteer from the audience for a demonstration with the elephants.

"At the end of the floating market day, we went to my host family's parents house and had a large Thai dinner," said Machula. "It seemed like everybody in town was there

because they all wanted to meet the American who worked for NASA. After dinner we all crowded into one of the rooms and talked for about two hours. Speaking Thai, supplemented with a lot of sign language, I told them about my day's experiences, such as getting a massage from an elephant!"

"One of the unforgettable moments in my life was when the great grandmother, the elder of the house, announced to everybody that I was to be treated as family and welcome back anytime. I had worked hard to blend into the culture as much as possible and this night I was truly

successful," said Machula.

According to Greg Hayes, JSC human resource academic coordinator, the experience gained in the international environment is a true asset for JSC's future leaders.

"With the global responsibilities and relationships challenging NASA and JSC today, this is an invaluable opportunity for us to participate in this multinational, multidisciplinary space education and research program," said Hayes. "Learning and understanding other cultures is necessary to advance the space program and work with our international partners."

The Human Resources Development Branch is accepting nominations for the 2000 ISU summer session, which will be held in Valparaiso, Chile. Directors should submit nominations by December 17. ■

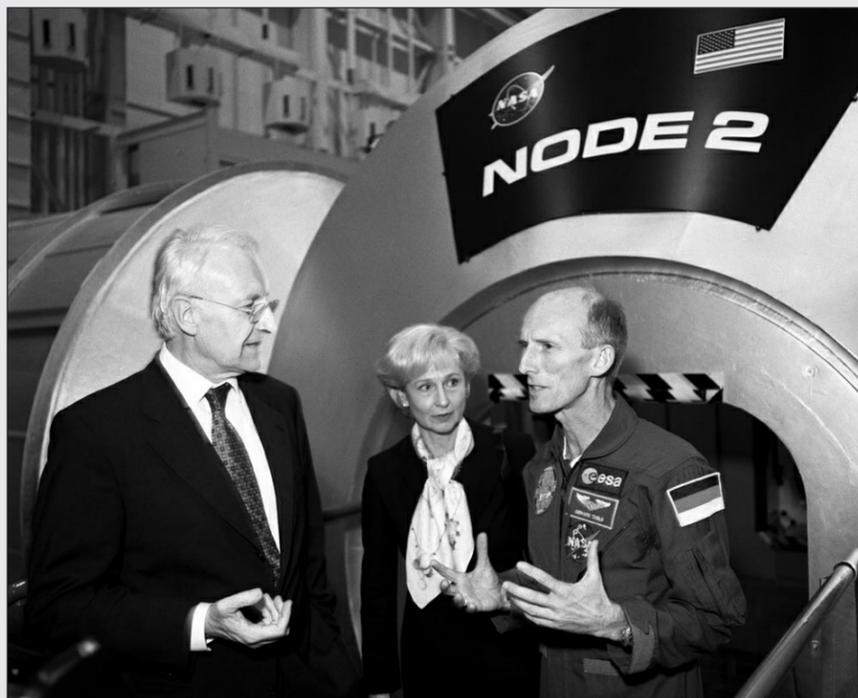
Learning and understanding other cultures is necessary to advance the space program and work with our international partners.

– Greg Hayes

Bavarian Minister-President Stoiber visits center

Dr. Edmund Stoiber, the Minister-President of Germany's oldest and largest state, toured JSC in October as part of a recent visit to the U.S. Stoiber and a delegation of 40 assistants and staff began their visit with a greeting by JSC Deputy Director Capt. James Wetherbee. The contingent also received a personal tour of the X-38 project in Bldg. 220. Col. Robert Cabana, manager of international operations for the ISS Program Office, and ESA Astronaut Gerhard P. J. Thiele, Ph.D. guided the group through the ISS and space shuttle trainers.

"Dr. Stoiber was very receptive to Colonel Cabana's remarks about the future of the international cooperation in space," said Gerhard. "Bavaria invests a lot of money in space-related activities - on top of what the federal government in Berlin spends. Therefore it was very valuable for Dr. Stoiber



to personally see some of the products and developments that result from such investments."

The delegation's tour was capped by a visit to the Mission Control Center, old and new, with a briefing by Milt Heflin, Flight Director Office deputy chief.

Bavaria is Germany's southernmost state and home to more than 12 million Germans. Many of Germany's prominent aerospace companies are located in Bavaria, as is the German Space Operations Center.

Dr. Stoiber has served as the Minister-President of Bavaria since May 1993. Prior to that appointment, Dr. Stoiber presided as State Minister of the Interior and State Minister and Head of the Bavarian State Chancellery. ■

Dr. Edmund Stoiber, Minister-President of Bavaria, and wife Karin visit with ESA Astronaut Gerhard Thiele, Ph.D. near the ISS mockups.

PEOPLE *on the* **MOVE**

Human Resources reports the following personnel changes:

Key Management Assignments

Jeanie Carter was selected as deputy chief information officer in the Office of the Chief Information Officer.
Betsy Hodges was selected as assistant chief, Logistics Division, Center Operations Directorate.

Promotions

Christy Herring was selected as an engineering technician in the Manufacturing, Integration, and Technology Branch, Manufacturing, Materials, and Process Technology Division, Engineering Directorate.
Richard Hill was selected as an engineering technician in the Manufacturing, Integration, and Technology Branch, Manufacturing, Materials, and Process Technology Division, Engineering Directorate.
Melita Scoggin was selected as the division secretary in the Manufacturing, Materials, and Process Technology Division, Engineering Directorate.

Reassignments Between Directorates

Gary Kane moves from the Mission Operations Directorate to the Systems Management Office.
James Ortiz moves from the Mission Operations Directorate to the Systems Management Office.
Richard Whitlock moves from the Office of the Chief Financial Officer to the Systems Management Office.
Dennis Hehir moves from the Center Operations Directorate to the Mission Operations Directorate.
Claudia Cisneros moves from the Office of the Associate Director to the Space and Life Sciences Directorate.
Barbara Hopkins moves from the Engineering Directorate to the Space and Life Sciences Directorate.

Retirements

Paul Sollock of the Engineering Directorate.

Resignations

Sarah Kirby of the Mission Operations Directorate.
Yvette Melkerson of the Mission Operations Directorate.
Debra Wilson of the Safety, Reliability, and Quality Assurance Office.
Andy Titterton of the International Space Station Program Office.

DATES & DATA

December 3

Martians meet: Rice University, the National Space Society and the Mars Society host inaugural Mars Landing Party December 3 from 2 p.m. to 6 p.m. The free event will be held at Rice University's Sewall Hall in room 301. There will be free food, door prizes and numerous special guests including *Space Station Science* author Marianne Dyson. For more information call Murray Clark at (281) 367-2227 or email MClark@aol.com.

December 6

NSBE meets: The National Society of Black Engineers will meet at 6:30 p.m. December 6 at Texas Southern University, School of Technology, Rm. 316. For details, call Kimberly Topps at (281) 280-2917.

December 7

Quality Society meets: The Bay Area Section of the American Society for Quality will meet at 6 p.m. on Tuesday December 7 at the Ramada King's Inn on NASA Road One. No reservations are required. For details, contact Ann Dorris at x38620.

December 8

IAAP meets: The Clear Lake/NASA Chapter of the International Association of Administrative Professionals will meet at 5:30 p.m. December 8 at Bay Oaks Country Club. Cost is \$16. For details and reservations, call Tami Barbour at (281) 488-0055, x238.

JSC observes Native American Month

Angel Beene performs in the Bldg. 3 cafeteria as part of JSC's Native American Month observance last month. She is wearing a medicine dress known as the jingle or healing dress, typically worn by Native Americans during rituals performed to help heal the sick.



December 9

Airplane club meets: The Radio Control Airplane Club will meet at 7 p.m. December 9 at the Clear Lake Park building. For more information call Bill Langdoc at x35970.

MAES meets: The Society of Mexican-American Engineers and Scientists will meet at 11:30 a.m. December 9 in Bldg. 16, Rm. 111. For details, call George Salazar at x30162.

December 10

Solstice Party: JSC Astronomical Society hosts Winter Solstice Party December 10. For details contact Chuck Shaw at x35416.

December 12

Westside NSS meets: The "Westside" group of the Clear Lake Area chapter of the National Space Society will meet at 2 p.m. December 12 at Silicon Graphics, 11490 Westheimer, Suite 100. For details, call Murray Clark at (281) 367-2227.

December 14

Aero Club meets: The Bay Area Aero Club will meet at 7 p.m. December 14 at the Houston Gulf Airport clubhouse at 2750 FM 1266 in League City. For details call Larry Hendrickson at x32050.

CLA-NSS meets: The Clear Lake Area chapter of the National Space Society will meet at 6:30 p.m. December 14 at the Freeman Memorial Branch Library, 16602 Diana Lane. For details call Murray Clark at (281) 367-2227.

NPMA meets: The National Property Management Association will meet at 5 p.m. December 14 at Robinette and Doyle Caterers, 216 Kirby in Seabrook. Dinner costs \$14. For more information call Sina Hawsey at x36582.

Human Test Subject Facility seeks volunteers

The Human Test Subject Facility at JSC is currently recruiting post-menopausal or post-hysterectomy women (up to age 65) for a cardiovascular clinical study designed to determine the effects of estrogen on the heart and blood vessels. Volunteers must be non-smokers in good health with no allergies to medications. Volunteers must also have no history of cardiovascular diseases or breast cancer and not be on hormone replacement therapy.

To qualify, volunteers must complete the required physical exam which includes a blood work-up, ECG, vision and hearing screening, and a treadmill test. Volunteers may be compensated for their time (restrictions apply to NASA and contractor personnel).

For additional information and initial prescreening, contact Dr. Dominick D'Aunno at 281-483-5542.

NASA BRIEFS

X-43 HYPERSONIC FLIGHT RESEARCH VEHICLE DELIVERED

The world's first hypersonic air-breathing free-flight vehicle is no longer just a paper airplane. The first of three experimental vehicles, designated X-43A, recently arrived at NASA's Dryden Flight Research Center to prepare for flight in May 2000.

Flight of the X-43 vehicles will be the culmination of over 20 years of scramjet (supersonic combustible ramjet) research and the first time a non-rocket engine has powered vehicles at hypersonic speeds.

Built by Micro Craft, Inc., Tullahoma, TN, for NASA's Hyper-X program, the 12-foot-long, unpowered X-43 vehicles will significantly expand the boundaries of air-breathing aircraft. Three flights are planned – two at Mach 7 and one at Mach 10. The flight tests will be conducted within the Western Test Range off the coast of Southern California.

NASA FUELS LAND MINE REMOVAL EFFORTS

The same rocket fuel that helps power the space shuttle as it thunders into orbit will now be taking on a new – perhaps surprising – role, with the potential to benefit millions of people worldwide.

Leftover rocket fuel from NASA is being used to make a new flare that destroys land mines where they were buried, without using explosives. The flare was developed by Thiokol Propulsion in Brigham City, UT, the NASA contractor that designs and builds rocket motors for the space shuttle.

Thiokol is using the surplus propellant through an agreement with NASA's Marshall Space Flight Center. "Clearly, this project has the potential to save lives worldwide," said Marshall Center Director Arthur G. Stephenson. "Marshall is happy to help in this humanitarian endeavor."

NASA PROVIDES SOLUTIONS TO FARMERS

As many drought-stricken farms in America limp through the last harvest of the 20th Century, researchers are using remote sensing technology developed for the space program to help improve crop management and increase profitability.

The availability of inexpensive agricultural products for consumers in the next century could depend on such capabilities – potentially meaning the difference between "boom" and "bust" for American farmers in the new millennium.

At the Global Hydrology and Climate Center at NASA's Marshall Space Flight Center, NASA scientists are collaborating with university researchers to apply remote sensing technology to a sophisticated agricultural technique called precision farming.

In precision farming, growers break fields down into regions, or "cells," analyzing growth characteristics of each cell and improving crop health and yield by applying precise amounts of seed, fertilizer and pesticides as needed.

SPACE CENTER **Roundup**

The Roundup is an official publication of the National Aeronautics and Space Administration, Johnson Space Center, Houston, Texas, and is published by the Public Affairs Office for all space center employees. The Roundup office is in Bldg. 2, Rm. 181. The mail code is AP3. The main telephone number is x38648, and the fax is x32000. Electronic mail messages may be directed to:

EditorWilliam Jeffswilliam.p.jeffs@jsc.nasa.gov
 Assistant EditorNicole Cloutierncloutie@ems.jsc.nasa.gov

**PRSR STD
 U.S. POSTAGE
 PAID**
 WEBSTER, TX
 Permit No. G27